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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/670,876   | 09/25/2003  | John Chen            | 15436.247.4.1       | 5788             |
| 22913  | 7590        | 09/13/2005           | EXAMINER            |                  |
| WORKMAN NYDEGGER<br>(F/K/A WORKMAN NYDEGGER & SEELEY)<br>60 EAST SOUTH TEMPLE<br>1000 EAGLE GATE TOWER<br>SALT LAKE CITY, UT 84111 |             |                      | VANNUCCI, JAMES     |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2828                |                  |

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

**Office Action Summary**

Application No.

10/670,876

Applicant(s)

CHEN ET AL

Examiner

Jim Vannucci

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
 Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 7-11, 14-16 and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Thijs et al.(5,399,885).

Claim 1, figure 1 discloses an optical electronic device having a first cladding layer(2) separated from a second cladding layer(5) by an active layer(3), a ridge waveguide(32) formed from a portion of the top cladding layer(5) having a ridge top surface deposited from the active layer by a first distance, and a semiconductor mesa(12) fashioned from a protective layer(21) separate from the top cladding layer(5) having a mesa top surface deposited from the active layer by a second distance greater than the first distance so that the semiconductor mesa shields the ridge waveguide from mechanical damage(col. 7, lines 25-35).

Claim 2, the ridge waveguide(32) disclosed in figure 1 is displaced between a first channel(33) and a second channel(33).

Claims 3 and 9, figure 1 discloses a metal contact(7) deposited over at least a portion of the ridge waveguide(32).

Claims 4 and 10, the ridge waveguide(32) in combination with the metal contact(7) disclosed in figure 1 has a distance from the active layer(3) less than the second distance.

Claims 5 and 15, the semiconductor mesa(12) comprises InP(table 1, page 7).

Claim 7, the optical electronic device disclosed in figure 1 can be a device selected from the group consisting of a Fabry-Perot laser, a DFB laser, an optical modulator, and a semiconductor optical amplifier(cols. 1-2).

Claim 8, figure 1 discloses a semiconductor laser wafer having an active layer(3), two optical cladding layers(2 & 5), a ridge waveguide(32) having a ridge top surface deposited from a first surface of the semiconductor laser wafer by a first distance, a plurality of semiconductor mesas(12) formed on the semiconductor laser wafer and separated from the two optical cladding layers and having a mesa top surface disposed from the first surface by a second distance greater than the first distance so that the plurality of semiconductor mesas shield the ridge waveguide from mechanical damage(col. 7).

Claim 11, the metal contact(7) disclosed in figure 1 has a thickness of less than about one micron(col. 7, table).

Claim 14, figure 1 discloses a highly doped semiconductor contact layer(6) deposited on the first cladding layer(5), a ridge waveguide(32) contacting the contact layer(6) and a metal contact layer(7) formed on the contact layer where the ridge waveguide has a ridge top surface deposited from a first surface of the laser die by a first height, and at least one semiconductor mesa(12) formed on the contact layer(6)

and extending a distance above a top surface of the metal contact to form an elevated surface shielding the ridge from mechanical damage(col. 7).

Claim 16, the first cladding layer and the second cladding layer disclosed in figure 1 are materials selected from the group consisting of III-V semiconductor materials(col. 7, table).

Claim 18, figure 1 discloses an upper surface of the ridge waveguide(32) contacting the contact layer(6).

Claim 19, the die disclosed in figure 1 has a peripheral edge and the contact layer(6) terminates proximal to the peripheral edge of the laser die.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6, 12-13, 17 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thijs in view of Makita et al.(6,888,870).

Thijs discloses a second distance that is .1 micron greater than the first distance, and a protective layer that is .1 micron thick. Thijs does not disclose an etch stop layer.

Claim 6, figure 1 of Thijs discloses an etching process for the protective layer(21) that is deposited on the top cladding layer(5; & col. 9, line 1), but not an etch stop layer. Figure 1 of Makita discloses an etch stop layer(105).

Claim 12, the second distance would be at least 0.5 micron greater than the first distance if the protective layer(109) disclosed in figure 1 of Makita is used in the device disclosed in Thijs.

Claim 13, the protective layer(109) disclosed in figure 1 of Makita has a thickness of between about 1.5 and 3.0 microns(col. 9, lines 27-29).

Claim 17, the elevated surface would be elevated from the metal contact layer deposited on the ridge waveguide disclosed in Thijs by at least about 0.5 micron if the protective layer(109) disclosed in Makita was used in the device disclosed in Thijs.

Claim 20, Thijs discloses forming a wafer having a semiconductor layer sequence that includes an active layer, top clad layer, and a semiconductor protection layer, a first semiconductor mesa and a second semiconductor mesa in the wafer, a ridge waveguide between the first semiconductor mesa and the second semiconductor mesa where the first semiconductor mesa and said second semiconductor mesa are positioned and have a surface height sufficiently greater than a surface height of the ridge waveguide to form an elevated surface shielding the ridge waveguide from mechanical damage as referenced above.

Thijs discloses the etching process, does not disclose an etch-stop layer.

Figure 1 of Makita discloses an etch-stop layer(105) for use in an etching process.

Claim 21, Thijs discloses masking and etching layers on a wafer(cols. 8-9) and masking the wafer to expose regions in which ridge lasers are to be formed, and etching the protection layer in unmasked regions to form the first and second semiconductor

mesas above an etched region(col. 9, lines 45-48) would be obvious given these disclosures.

Claim 22, Thijs discloses etching layers of the device(col. 5, lines 6-31) and etching the top clad layer between the first semiconductor mesa and the second semiconductor mesa would be obvious over this disclosure.

Claim 23, Thijs discloses etching the top clad layer(5A) to within about 0.17 micron of the active layer(col. 7, table).

Claim 24, Thijs discloses applying a metal contact layer(7) to at least a portion of the ridge waveguide.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the protection and etch stop layers disclosed in Makita with the device disclosed in Thijs for improved device manufacturing characteristics(col. 4, lines 9-16).

### ***Correspondence***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Jim Vannucci whose phone number is (571) 272-1820.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center whose telephone number is (703) 308-0956.

Papers related to Technology Center 2800 applications only may be submitted to Technology Center 2800 by facsimile transmission. Any transmission not to be considered an official response must be clearly marked "DRAFT". The faxing of such

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papers must conform with the notice published in the Official Gazette, 1096 OG 30

(November 15, 1989). The Technology Center Fax Center number is (571) 273-8300.

A handwritten signature in black ink, reading "James Vannucci". The signature is written in a cursive style with a large, looping initial "J".

James Vannucci